



# SEASONAL TREND AND SPATIAL PATTERN OF RAINFALL IN MYSURU DISTRICT

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## ABSTRACT

The term Rainfall refers to the amount of rain that falls in a place during a particular period. Mysuru district has receives on an average annual rainfall is 778.4mm from 1990 to 2018. It was varies with seasons as well as in Spatial. Therefore the present paper analyse the Seasonal and Spatial trend of Rainfall in Mysuru District, for this purpose 40 (2018) rain gauge locations Monthly rainfall data has been collected between 1990 to 2018 from District Statistical Office, Mysore. Here, Simple statistical tools like percent, average and statistical techniques like Index of concentration are used and the cartographic and Arc GIS software are used for the preparation of trend lines and maps respectively. The result found that in season wise on an average about 47% of annual rainfall occurs during the South west monsoon period, it is only less than 1 percent in winter or post monsoon season. The pre monsoon rainfall is more consistence than the post or winter season rainfall. In spatial level, all taluk receives the high and low rainfall in South west monsoon season and winter season respectively.

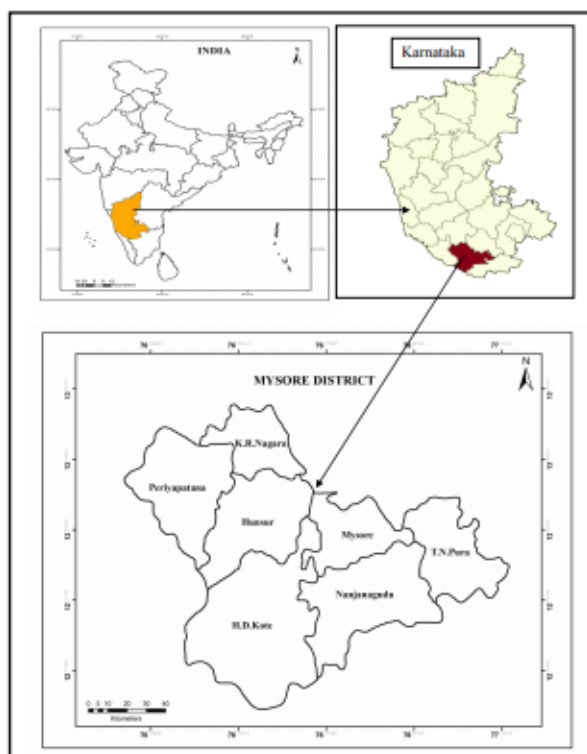
**Keywords:** Rainfall, Season, Region, Index of concentration (IOC)

### 1.0: Introduction

The term Rainfall refers to the “amount of rain that falls in a place during a particular period”. Rainfall is an important element of economic growth of an area or region, especially in a country like India, where a large number of people are occupied in agricultural activities. In our study area the amount of rainfall does not show an equal distribution, either in space/region, season or in time. It varies from heavy rain to scanty in different parts of Mysuru district. It also has great seasonal and spatial variations in distribution. Therefore, the study of rainfall spatial distribution and its seasonal rhythms is very important, as the district economy is highly dependent on agriculture.

**2.0: Study area:** The study area extends from 11° 44' to 12° 37' North latitudes and 75° 57' to 77° 12' East longitudes. It is bound on the North by Mandya and part of Hassan districts and on the East by Chamarajanagar. Kodagu forms its western boundary and the southern portion is covered by Kerala and part of Chamarajanagar district. The total geographical area of Mysore district is 6,241 km<sup>2</sup>. The district gets more rainfall during two seasons, namely, the Southwest monsoon or Rainy season during June to September and Northeast or retreating monsoon season during October and December.

**Map:** Location map of Mysuru District



### 3.0. Objectives: The present paper has the following objects.

- To analyse the Determine factors of rainfall in Mysuru district.
- To examine the Seasonal trend and spatial patterns of rainfall in Mysuru District from 1990 to 2018.

**4.0. Methods and Materials:** The present study is purely based on the secondary source of information. The data related to the rainfall at rain gauge station level have been collect because the average annual or seasonal rainfall at a place does not give sufficient information regarding its capacity to support any decision-making process. Therefore, keeping that in mind 40 rain gauge stations rainfall data has been collected from 1990 to 2018 from the District Statistical Office, Mysore. But the Rain gauge stations numbers are varies in some years. Mysuru District has 49 (07) Rain gauge station in 1990, it was decreases to 48 (08) in 2010 and further decreases to 41 (02) in 2010.

The researchers have been using various statistical methods and techniques for the analysis of Seasonal and spatial trends of rainfall in Mysuru district. Such as average, Index of Concentration etc. Use the cartographic techniques and Arc GIS software for the preparation of graphs and maps respectively.

SL	H.D.K ote (07)	Huns ur (04)	K.R.N agara (07)	Mysu ru (06)	Nanja ngudu (04)	Periya patna (06)	T.Nar asipura (06)
1	H.D.K ote C	Huns ur. C	K.R. Nagar a .C	Mysu ru.C	Nanja ngudu .C	Periya patna C	T.nara sipura .C
2	Banka vadi	Bilike re	Bhery a	CSRT C	Bilike re	Alalur u	Bann ur
3	Beerva lu	Hunas uruH. M.S	Chunc hanak atte	Naga nahall i	Dodda kavala nde	Bettad apura	Mugu ru
4	Hampa pura	Chilk unda	Saligr ama	Elaval a	Nagan apura	Bylak uppe	Talak adu
5	Beech anahall i	-	Hanas oge	Varun a	-	Muttu ru	Hunas uru
6	Saragu ru	-	Hebba lu	Jayap ura	-	Ravan duru	Sosal e
7	Taarak a	-	Mirle	-	-	-	-

Source: District Statistical Office, Mysore. Note: C\_ Centre (2018)

**Table.4.1:** Name and location of the Rain Gauge station in Mysuru district at Taluk level in 2018**Map.4.0:** Location of Rain gauge Stations in Mysuru district**6.0. Discussion:****6.1: Determination factors of rainfall I Mysuru district:**

Mysuru district is an administrative district located in the Southern part of the Karnataka state. It consists of 7 taluks such as Heggada Devana Kote, Hunsur, Krishna Raja Nagara, Mysuru, Nanjangud, Periyapatna, and Tirumakudalu Narasipura. From the last 29 years, Mysuru district received an average 774.5mm rainfall, which is various within the district. The highest and lowest average rainfall found in Periyapatna and Nanjangud Taluks respectively.

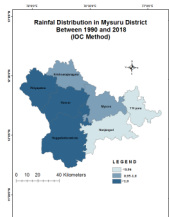
In Mysuru district, the amount of rainfall is mainly determined by the physical variables of the Taluks like location, elevation, and forest cover areas etc...

In Mysuru district, the amount of rainfall gradually decreases from West to East direction. Therefore, the western taluks of the district like H.D.Kote, Hunsur, Periyapatna received above district average rainfall with 852.7, 830.7 and 856mm respectively, and the rest of the taluks like K.R. Nagara, Nanjangud and T. Narasipura are located in the North and East direction; therefore, they received below district average rainfall with 747.9, 683.6 and 721.1mm respectively (see location Map). The taluk like Mysuru, located in the center of the district, as a result, its average rainfall (774.7mm) is equal to the district average.

The amount of rainfall is also influenced by the elevation of the Taluks. In Mysuru district, the mean sea level of the land is gradually decreases from west to east direction. The taluks like Periyapatna, Hunsur, H.D.Kote and K.R.Nagara are located at 849, 792, 694 and 788m above the Mean Sea level respectively, and the eastern taluks like Mysuru, T.Narasipura and Nanjangud are located at 770, 638 and 657 m above the mean sea level. Therefore, the elevated taluks received the above district average rainfall, remaining taluks received the below district average rainfall.

Another one most important variable to determine the amount of rainfall in Mysuru district is forest or vegetation covered area. The percent of forest area to the total Geographical area is also decreased from west to east direction of the district. The forest area of the district comes under the Mysuru circle. Mysuru circle comprises three territorial divisions, namely, Mysuru, Mandya and Hunsur forest divisions. Among these territorial Mysuru and Hunsur forest divisions come under the Mysuru district.

Mysuru forest division is situated in the southern part of Karnataka state, and it consists of taluks like Mysuru, T. Narasipura, Nanjangud and H.D. Kote. The total extent of forest area of the division is 16,037 hectares, which constitute only about 3.73% of the Geographical area of the division (4,300 Km<sup>2</sup>). The rest of the taluks like Periyapatna, Hunsur and K.R.Nagara come under the Hunsur forest divisions. The extent of notified forests of Hunsur division is 13,636.95 hectares, which constitute about 5.6% of the Geographical area of the division (2,432.91 Km<sup>2</sup>). It indicates the western taluks have nearly one to double forest area compared with eastern taluks of the Mysuru district. Therefore, western taluks received above the district average and eastern taluks received the below the district average rainfall.

**Map.6.0:** Rainfall Concentration in Mysuru district from 1990 to 2018

Name of the Taluks	Amount of rainfall (mm)	IOC
H. D. Kote	852.7	1.10
Hunsur	830.7	1.07
K. R. Nagara	747.9	0.97
Mysuru	774.7	1.00
Nanjangud	638.6	0.82
Periyapatna	856	1.11
T. Narasipura	721.1	0.93
District	774.5	1.0

Source: Compiled by the author

**Table 6.0:** Average rainfall Concentration in Mysuru district from 1990 to 2018

Overall, in Mysuru district, the rhythms of rainfall are determined by the location, elevation, and forest cover area of the taluks. All these variables are more favorable in western taluks like Periyapatna, Hunsur, and K.R.Nagara and unfavorable in eastern taluks like T. Narasipura, Nanjangud, and H.D. Kote. Therefore, the taluks Periyapatna, Hunsur, and K.R.Nagara received the above district average rainfall from the last 29 years, and the rest of the taluks received the below the district average rainfall. Above the table 6.0 and Map 6.0 shown that the concentration of rainfall from the last 29 years. According to these table and map, above the district average, below the district average, and normal rainfall concentrated in the western taluks, eastern taluks, and center taluk of the district respectively.

**6.2: The Seasonal trend and spatial patterns of rainfall in Mysuru District from 1990 to 2018.**

The Meteorological department of Old Mysore state and the Meteorological center of Bengaluru have divided the year into four seasons. They are:

1. Winter or Cold weather or Post Monsoon Season: January to February.
2. Summer or Hot weather or Pre-Monsoon Season: March to May
3. Southwest Monsoon Season: June to September
4. Retreating or Northeast Monsoon Season: October to December.

Taluk	Winter	in %	Summer	in %	S. W. Monsoon	in %	N.E. Monsoon	in %	All Seasons
H. D. Kote	8.8	1.0	208.1	24.4	433.7	50.8	202.6	23.7	853.2
Hunsur	7.1	0.9	192.2	23.0	390.3	46.8	244.6	29.3	834.3
K. R. nagara	4.9	0.7	180.6	23.9	323.7	42.9	245.0	32.5	754.3
Mysuru	7.4	0.9	211.9	27.1	336.0	42.9	227.2	29.0	782.5
Nanjangud	5.1	0.8	186.0	29.4	279.3	44.1	163.1	25.8	633.5
Periyapatna	4.9	0.6	191.0	21.9	484.6	55.7	189.8	21.8	870.3
T.Narasipura	4.8	0.7	171.8	23.8	322.3	44.7	222.2	30.8	721.1
District	6.1	0.8	191.7	24.6	367.1	47.2	213.5	27.4	778.5

Source: Compiled by the author

**Table 6.1:** Seasonal and Spatial trend of Rainfall (in MM)in Mysuru District between 1990 and 2018

In season wise on an average about 47% of annual rainfall occurs during the Southwest monsoon period it is only less than 1 percent in winter or Post Monsoon season. The Pre-Monsoon/Summer season rainfall is more consistence than the post or winter season rainfall in the district and all taluks.

Taluks	Average (mm)	IOC
H. D. Kote	853.2	1.10
Hussur	834.3	1.07
K. R. Nagara	754.3	0.97
Mysuru	782.5	1.01
Nanjangud	633.5	0.81
Piriyapatna	870.3	1.12
T.Narasipura	721.1	0.93
District	778.5	

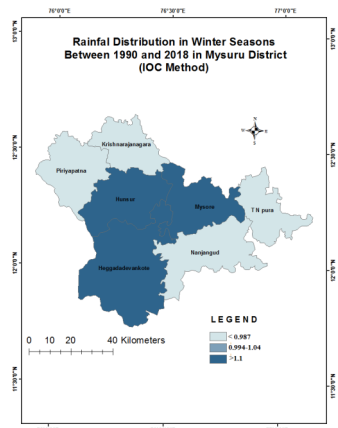
Source: compiled by the author

**Table 6.2:** Taluk wise Distribution of Rainfall between 1990 to 2018

In regional level all taluk receives the high rainfall in Southwest monsoon period and lowest rainfall in winter season. Rainfalls generally decrease from west to east therefore taluks like Periyapatna, H.D.Kote and Hunsur receives the high rainfall. Mysuru and K.R.Nagara receives the average and remaning taluks like T.Narasipura and Nanjangud receives low rainfall.

Taluks	Average rainfall (1990-2018)(MM)	IOC
H.D.Kote	8.8	1.426
Hunsur	7.1	1.158
K.R.Nagara	4.9	0.801
Mysuru	7.4	1.206
Nanjangud	5.1	0.824
Periyapatna	4.9	0.803
T.Narasipura	4.8	0.781
District	6.1	

**Table.6.3:** Spatial distribution of rain fall in Winter season



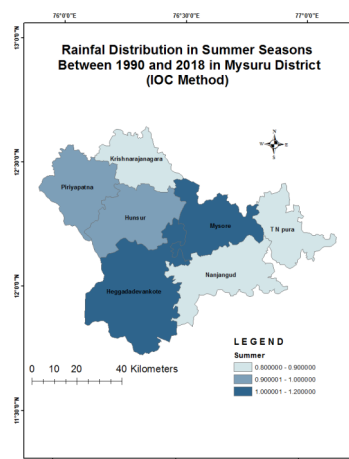
**6.2.1:** Taluk wise rainfall distribution in winter or cold weather or post Monsoon season

In winter season, Taluks like H.D.Kote, Hunsur and Mysuru received the high rainfall with the value of above 1.0 of Index of concentration. Remaining taluks received the low rainfall with less than 1.0 Value of IOC.

Taluks	Average rainfall (M M )	IOC
H . D . K O T E	2 0 8 . 1 5	1 . 0 9
H u n s u r	1 9 2 . 2 3	1 . 0 0
K . R . N a g a r a	1 8 0 . 6 3	0 . 9 4
M y s u r u	2 1 1 . 8 5	1 . 1 1
N a n j a n g u d	1 8 5 . 9 8	0 . 9 7
P e r i y a p a t n a	1 9 0 . 9 9	1 . 0 0
T . N a r a s i p u r a	1 7 1 . 7 7	0 . 9 0
D i s t r i c t	1 9 1 . 6 6	

Source: Compiled by author

**Table.6.4:** Spatial distribution of Rain fall in Summer Season



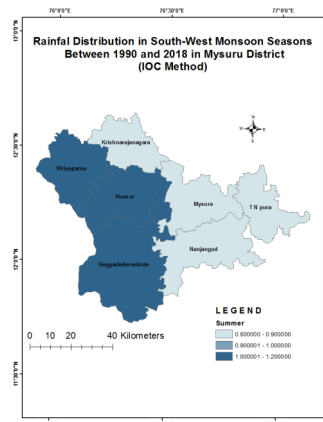
**6.2.2:** Taluk wise distribution of rainfall in summer or hot weather or Pre-Monsoon season

During the summer season, H.D.Kote and Mysuru taluks received the high rainfall with above 1.0 Value of Index of concentration. Hunsur and Periyapatna taluk received normal rainfall with 1.0 IOC value. K.R.Nagara, Nanjangud and T. Narasipura Taluks received the low rainfall with less than 1.0 IOC value.

T a l u k s	S . W . M o ( M M )	I O C
H . D . K o t e	4 3 3 . 6 7	1 . 1 8
H u n s u r	3 9 0 . 2 9	1 . 0 6
K . R . N a	3 2 3 . 7 5	0 . 8 8
M y s u r u	3 3 6 . 0 4	0 . 9 5
N a n j a n g	2 7 9 . 3 3	0 . 7 6
P e r i y a p	4 8 4 . 5 8	1 . 3 2
T . N a r a s	3 2 2 . 3 4	0 . 8 8
D i s t r i c t	3 6 7 . 1 4	

Source: Compiled by the

**Table.6.5:** Spatial distribution of Rain fall in Southwest



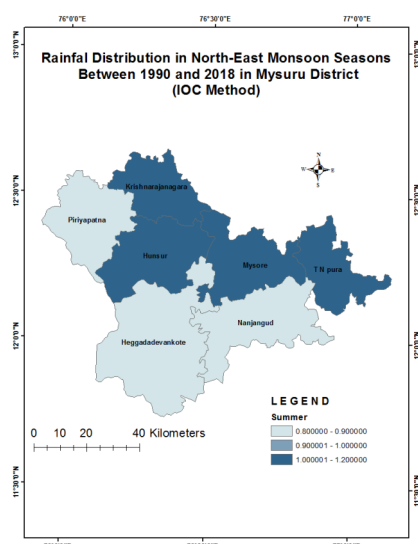
### 6.2.3: Taluk wise distribution of rainfall in Southwest Monsoon Season

Mysuru district received the high rainfall during the Southwest Monsoon season and the amount of rain fall is gradually decreased from south west to north east direction of the district. The taluks are located in SW direction have hills and good forest resources such as Nagaraholle, Bandipura, Therefore the taluk like Periyapatna, H.D.Kote and Hunsur receive high rainfall with above 1.0 value of IOC, Mysuru receive average with 0.92 And remaining taluk such as K.R.Nagara, Nanjangud, and T.Narasipura receives low rainfall with below 1.0 value of IOC due to their location.

Taluks	N . E . Monsoon	IOC
H . D . K o t e	2 0 2 . 6 3	0 . 9 4
H u s s u r	2 4 4 . 6 1	1 . 2
K . R . N a g a r a	2 4 5 . 0 0	1 . 2
M y s u r u	2 2 7 . 1 6	1 . 1
N a n j a n g u d	1 6 3 . 1 5	0 . 8
P e r i y a p a t n a	1 8 9 . 7 5	0 . 9
T . N a r a s i p u r a	2 2 2 . 2 1	1 . 1
D i s t r i c t	2 1 3 . 5 0	

Source: Compiled by the Author

Table.6.6: Spatial distribution of rain fall in Northwest Monsoon season



### 6.2.4: Taluk wise distribution of rainfall in Retreating or Northeast Monsoon season

In Retreating or Northeast Monsoon season Hunsur, K.R.Nagara, Mysuru and T.Narasipura Taluks receive the high rainfall with above 1 value of IOC value. H.D.Kote, Periyapatna and Nanjangud taluks receives low rain fall with less than 1 value of IOC.

Over all the seasonal and spatial rythams of rain fall in Mysuru distcirt from the last 29 years. The taluks like Periyapatna, H.D.Kote, Hunsur And Mysuru taluks receives on an average above the distrcit average of very high, high and normal rainfall. The rest of taluks like K.R.Nagra, T.Narasipura and Nanjangud received the below on an average of high and above on an average of low and very low rain fall of the district due to their location.

### 7.0: Findings

- In our study area, the location, elevation and forest covered area determine the amount of the rainfall. Therefore the high altitude and hugh forest area covered taluk received the high and the rest of the taluks received the normal or mrginal normal rainfall.
- Mysuru district receives an average annual rainfall is 778.4mm from 1990 to 2018. It is various with seasons as well as in region.
- In season wise on an average about 47% of annual rainfall occurs during the South West monsoon period it is only less than 1 percent in Winter or Post Monsoon season.
- In region level all taluk receives the high rainfall in South West monsoon period and lowest rainfall in Winter season.
- The rainfall generally decreases from West to East as a result taluk like Periyapatna, H.D.Kote and Hunsur receives the high rainfall and remaining taluks receives the low rain fall.

**8.0: Conclusion:** In our study area the amount of the rainfall is mainly determined by the Location, altitude, forest area and urbanization process ect.. and it various from one season to season and region to region. Karnataka is the second high drought prone area after the Rajashan in India due to the deforestation,

unscientific practises of Agriculture methods, lack of propare management of rainfall. Therfeore, Government and others panning authorities give more attention to these areas and try to control the deforestation and pramote the aforestation otherwise shortly our state karnataka converted into desert land.

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